Competitive Price and Depreciation Analysis for Used Toyota Camry in Brighton, MA, and Springfield, VA

Assignment 4

AD688 Web Analytics

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Executive Summary:

This intelligence report examines the used Toyota Camry market in Brighton, MA, and Springfield, VA, leveraging web scraping techniques to gather data and assess price and depreciation trends. Despite data limitations, a thorough analysis of car prices and depreciation rates has been conducted. The findings reveal Brighton's average used Camry price as higher than Springfield's, potentially influenced by variables beyond the scope of this report. Depreciation rates in both locales are strikingly similar, reflecting a marginal difference in annual loss of value. Based on the original price and average depreciation, the report recommends a price for a 3-year-old Toyota Camry LE to be $18919.69 in Brighton and $18929.77 in Springfield. These figures are very similar. The report concludes that while depreciation is a critical factor in used car valuation, other elements such as vehicle condition and mileage also significantly influence pricing strategies.

Introduction:

This report provides an analysis of the used Toyota Camry market in Brighton, MA, and Springfield, VA, with a focus on pricing and depreciation trends. The objective is to offer a recommended price for a 3-year-old Toyota Camry in both locations to guide potential sellers and buyers.

Methodology:

I chose the Toyota Camry as my car as it is a prevalent model here in the US. I used Python and the BeautifulSoup package for parsing the website Cars.com. I scraped the main listing page to get the URLs for each car's detail page. I used the code to request to extract the car name, mileage, pricing, rating, and rating count for each car. I was unable to get data for all of the listed cars but I was able to parse through quite a few. The cities I choose are Brighton Massachusetts and Springfield Virginia. I chose two zipcodes from the cities and filtered the data from a 50-mile radius. I saved the collected data in a CSV file

Findings:

Price Analysis:

Figure 3 shows the average price of a used Camry in each city and the code used to calculate the results. Brighton, MA, showed an average price point of $22366.19 for Toyota Camrys, while Springfield, VA, had an average of $18602.14. The price of a used Camry in Brighton is higher than that of Springfield. The density plot in Figure 4 shows the trend. However, this could be because the used cars in Springfield are generally older models. Other factors may also play a vital role in this trend that is out of scope for this project.

Depreciation Analysis:

For the depreciation analysis, I used this formula-
Annual Depreciation = (Original Price−Current Price)/ Age of car in years

I used Excel to calculate each car's depreciation. I used Toyota's webpage to determine the original prices of each car model. I calculated the age of each car by subtracting the manufacturing year from the current year. Then I used the Annual Depreciation formula to calculate the annual depreciation for each car.

Figure 6 shows the depreciation for each car. Figure 7 shows the line graph of the depreciation values for both locations. They have some volatility, with the depreciation in Springfield occasionally being lower than in Brighton, but both follow a similar trend. The close proximity of the lines suggests that the depreciation rates for Toyota Camrys in both locations are quite comparable.

The average annual depreciation for Toyota Camrys in Brighton is -$2016.77, compared to -$2013.41 in Springfield. The depreciation is negative and the Brighton car on average depreciated more than Springfield cars.

Recommendations:

The three-year-old Toyota Camry LE's original price is $24,970.00.

To recommend a price for a 3-year-old Toyota Camry LE in both Brighton, MA, and Springfield, VA, I took the average annual depreciation rate for each city and multiplied it by three, then subtracted that from the original price.

The average annual depreciation rates for Brighton and Springfield are -$2016.77 and -$2013.41 respectively, the formula for the recommended price would be:

Recommended Price for Brighton =$24,970− (2016.77*3)

=18919.69

Recommended PriceSpringfield =$24,970− (2013.41*3)
=18929.77

Conclusion:

The market for used Toyota Camrys in Brighton, MA, and Springfield, VA shows that the results are very similar. The used Camry in Springfield will cost only slightly more than a used Camry in Brighton. This is because the depreciation cost in Springfield is ever so slightly lower than that of Brighton. Other factors such as mileage and the car's overall condition matter a lot in this case as well. Thus the recommended price is not totally accurate. However, this insight can provide valuable benchmarks for competitive pricing strategies.

Appendices:

```python
import requests
from bs4 import BeautifulSoup

def get_car_details(car_url):
    response = requests.get(car_url)
    soup = BeautifulSoup(response.text, 'html.parser')

    car_name = soup.find('h1', class_='listing-title').get_text().strip()
    mileage = soup.find('div', class_='listing-mileage').get_text().strip()
    price = soup.find('span', class_='primary-price').get_text().strip()
    rating = soup.find('span', class_='sds-rating__count').get_text().strip()
    rating_count = soup.find('a', class_='sds-rating__link sds-button-link').get_text().strip().split('(')[1].split(' ')[0]

    return car_name, mileage, price, rating, rating_count

# URL of the main listing page
url = 'https://www.cars.com/shopping/results/?dealer_id=&keyword=&list_price_max=&list_price_min=&makes[]=toyota&maximum_distance=1

response = requests.get(url)
soup = BeautifulSoup(response.text, 'html.parser')

# Find all car detail page links
car_links = soup.find_all('a', class_='vehicle-card-link js-gallery-click-link')

# Extracting and printing details for each car
for link in car_links:
    car_url = 'https://www.cars.com' + link.get('href')
    details = get_car_details(car_url)
    print(details)

# Add logic to handle pagination if necessary
```

Figure 1

```python
import csv

# Open a CSV file to write the results
with open('car_details.csv', 'w', newline='', encoding='utf-8') as file:
    writer = csv.writer(file)
    # Writing the header
    writer.writerow(['Car Name', 'Mileage', 'Price', 'Rating', 'Rating Count'])

    # Extracting and writing details for each car
    for link in car_links:
        car_url = 'https://www.cars.com' + link.get('href')
        car_name, mileage, price, rating, rating_count = get_car_details(car_url)
        writer.writerow([car_name, mileage, price, rating, rating_count])

print("Data scraped and saved to car_details.csv")
```

Figure 2

```
# Assuming brighton_data and springfield_data are your pandas dataframes
average_price_brighton = brighton_data['Price'].mean()
average_price_springfield = springfield_data['Price'].mean()

print(f"Average Price in Brighton, MA: ${average_price_brighton:.2f}")
print(f"Average Price in Springfield, VA: ${average_price_springfield:.2f}")
```

```
Average Price in Brighton, MA: $22366.19
Average Price in Springfield, VA: $18602.14
```

Figure 3

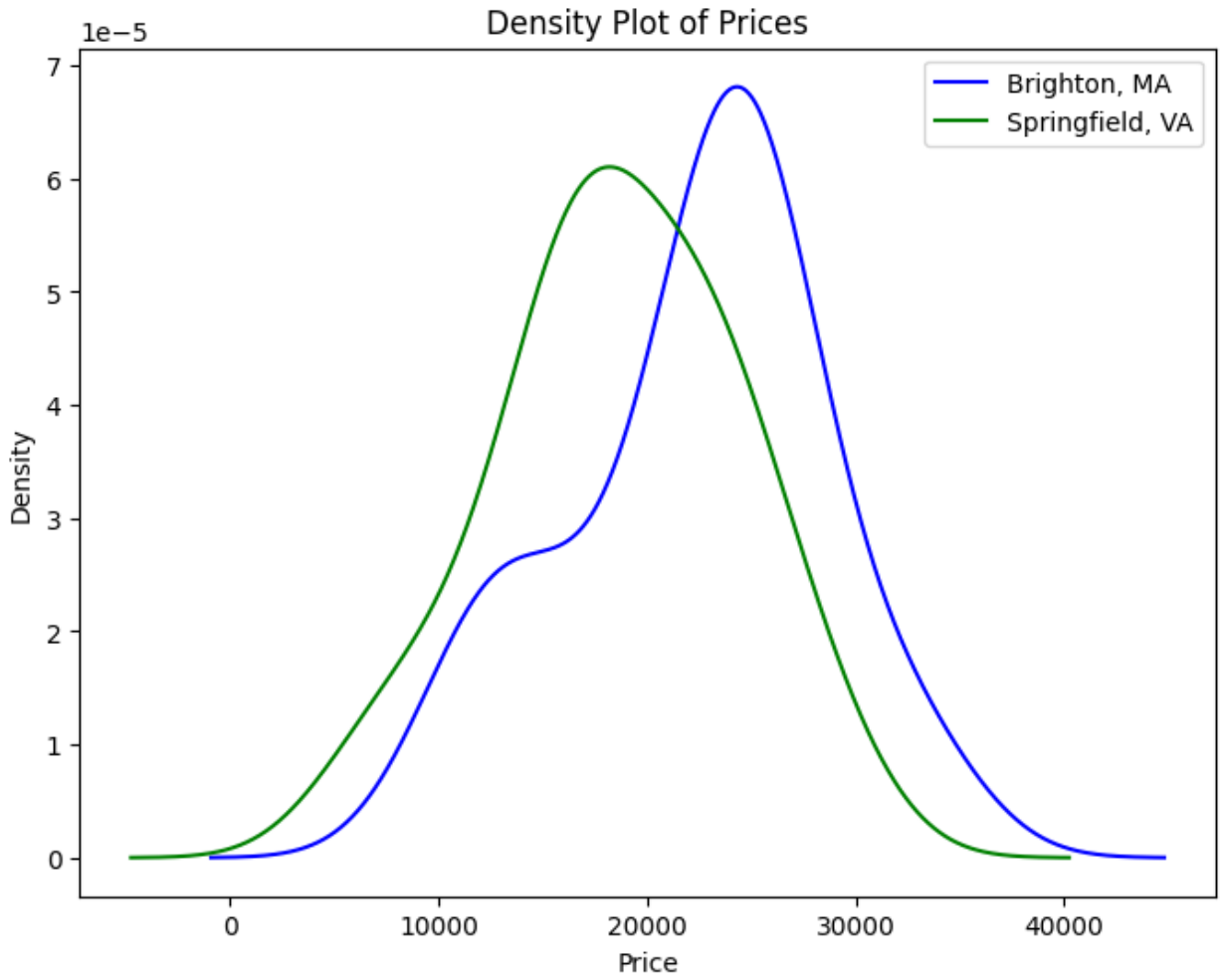

Figure 4

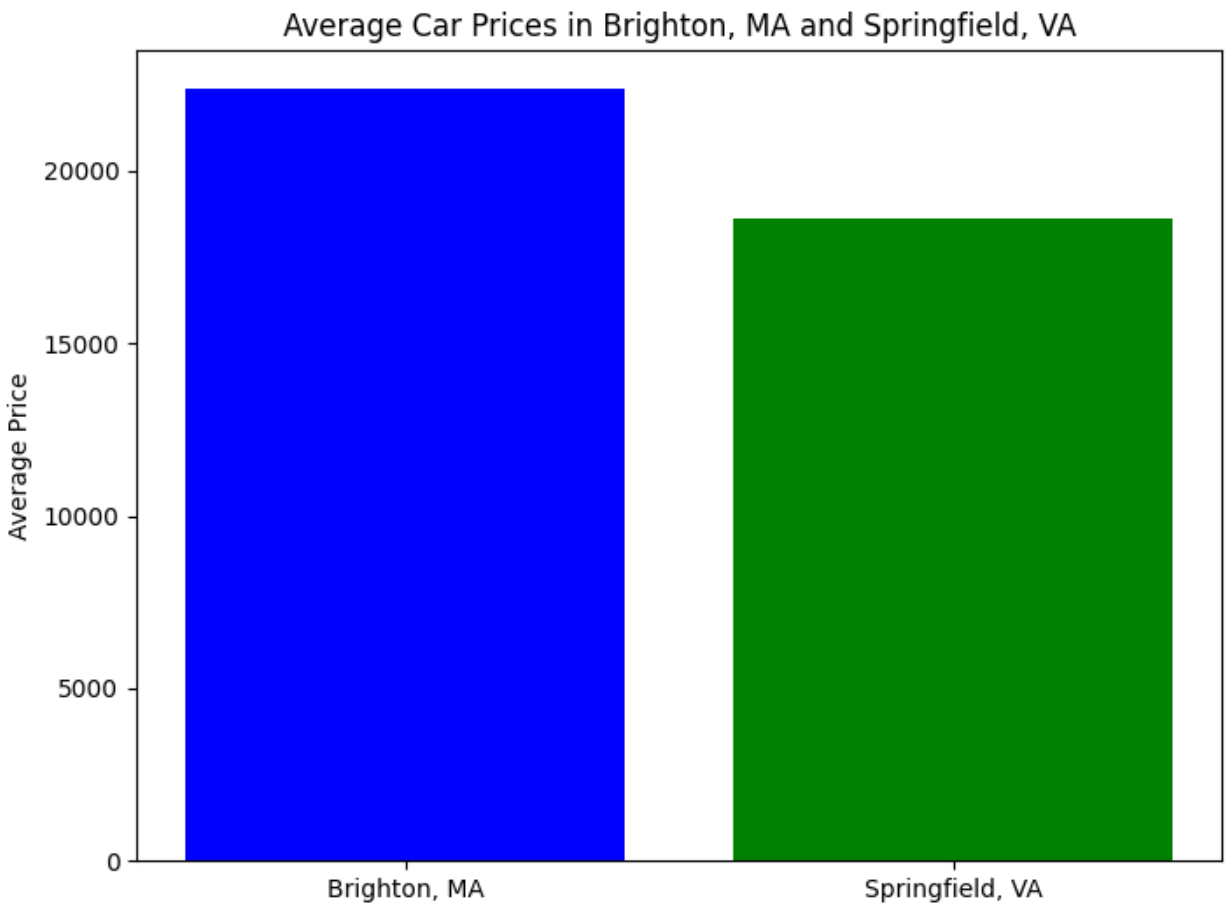
Average Car Prices in Brighton, MA and Springfield, VA
Average Price
20000
15000
10000
5000
0
Brighton, MA
Springfield, VA

Figure 5

Depreciation_brighton	Depreciation_springfield
($2,022.53)	($2,011.68)
($2,020.66)	($2,015.71)
($2,007.85)	($2,017.55)
($2,020.58)	($2,009.75)
($2,013.73)	($2,006.52)
($2,011.28)	($2,015.69)
($2,022.80)	($2,011.68)
($2,004.07)	($2,011.82)
($2,020.48)	($2,019.99)
($2,006.91)	($2,016.76)
($2,016.56)	($2,019.47)
($2,020.11)	($1,997.87)
($2,021.65)	($2,014.13)
($2,005.35)	($2,017.44)
($2,017.26)	($1,998.94)
($2,023.60)	($2,018.02)
($2,020.01)	($2,007.99)
($2,020.99)	($2,018.28)
($2,019.70)	($2,024.51)
($2,019.07)	($2,009.80)
($2,016.88)	($2,018.11)
($2,016.77)	($2,013.41)

Figure 6

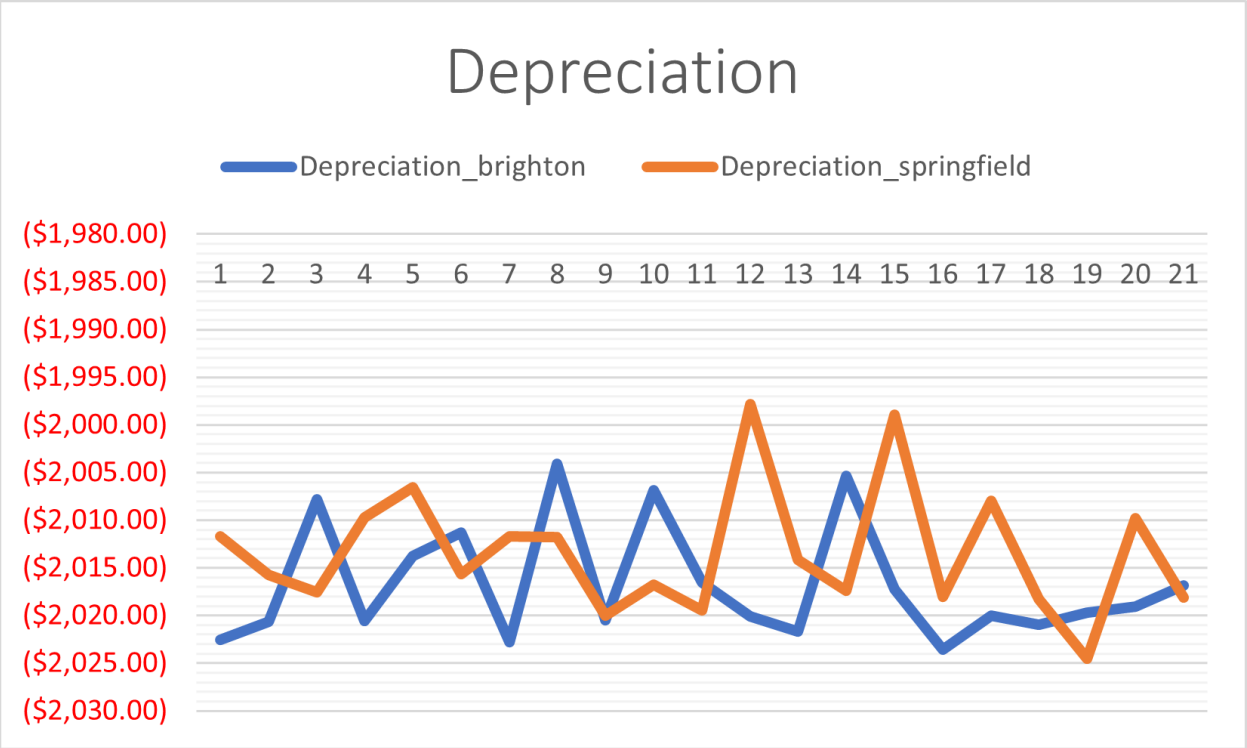

Figure 7

References:

Data extracted from Cars.com

Toyota. (2012, December 7). Toyota, Scion 2013 Prices: Camry, Prius, xB [Press release]. Retrieved from https://pressroom.toyota.com/toyota-scion-2013-prices-camry-prius-xb-dec7/